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(54) Abstract Title

Hinge-device of the snap-in type having adjustable abutting discs for vertical adjustment

(57) A hinge device of the snap-in type comprising two hinge leaves (1, 2, fig.1), wherein the second hinge leaf 2, is designed for snap-in engagement with a receiving part 7. The receiving part 7, has a pin/boss or the like (5, fig.1) that is yielding on spring action and designed to snap into a hole 4, or recess in the second hinge leaf 2. To provide vertical adjustment of the hinge, the receiving part 7, along opposing lateral edges of the pocket (8, fig.1) is equipped with adjustable abutting means consisting of rotatable, spring-loaded, eccentric discs 16, 17, having a plurality of contact edge faces. To maintain the eccentric discs 16, 17, in abutment against a respective lateral edge of the second hinge leaf 2, the respective disc is made in one piece with a hexagonal sleeve 16', 17' intended for engagement with a mating hexagonal key. Springs 18, 19, will cause a surface of the hexagonal sleeve to be spring-loaded, so that the eccentric discs 16, 17, must be turned stepwise against the action from the respective spring 18, 19. The second hinge leaf 2, may also have a pivot point means in the form of elevated proturbances (27', 28', fig. 8).

Fig.5.

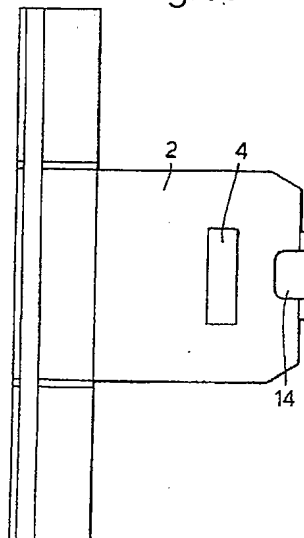
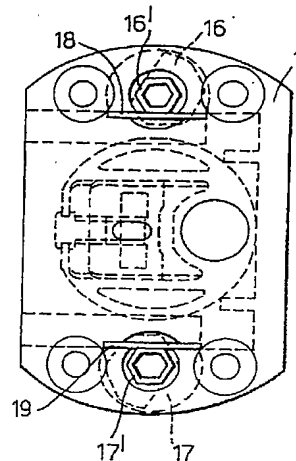


Fig.6.



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Fig.1.

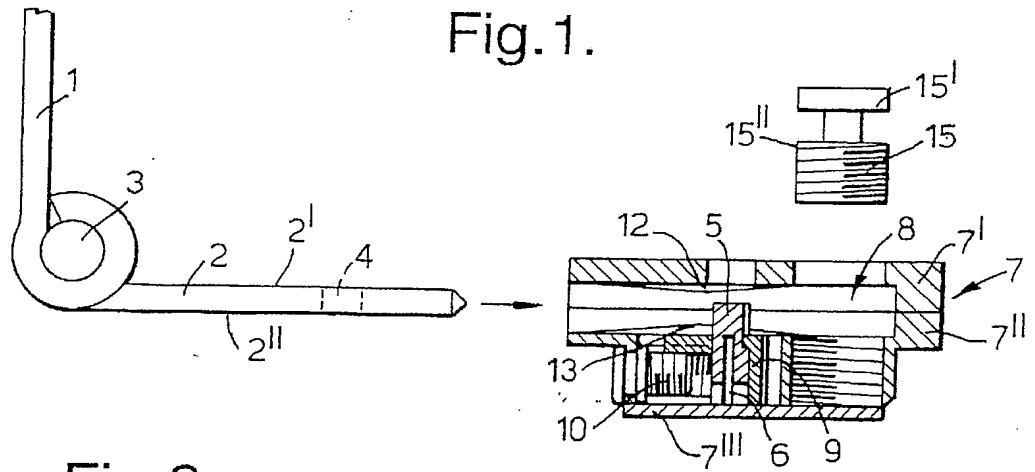


Fig.2.

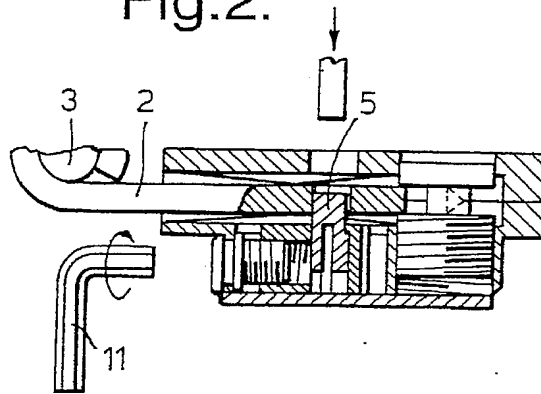


Fig.3.

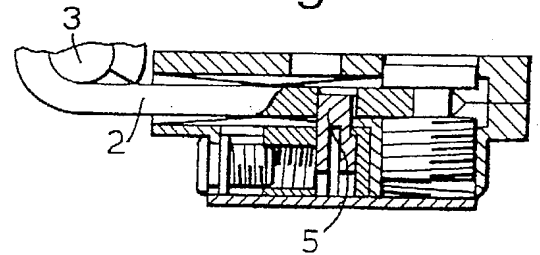


Fig.4.

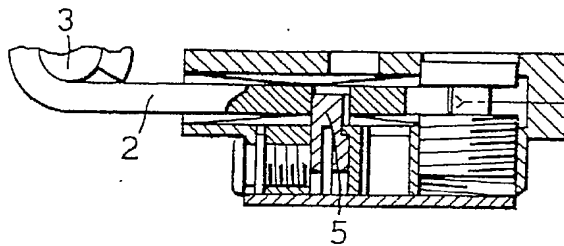


Fig.5.

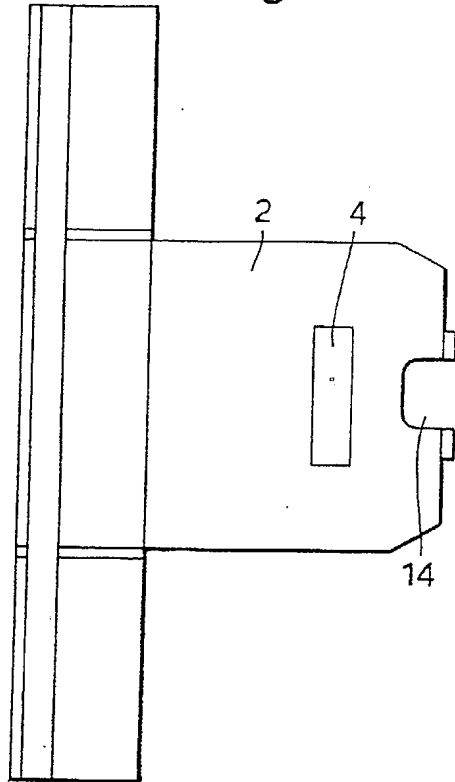


Fig.6.

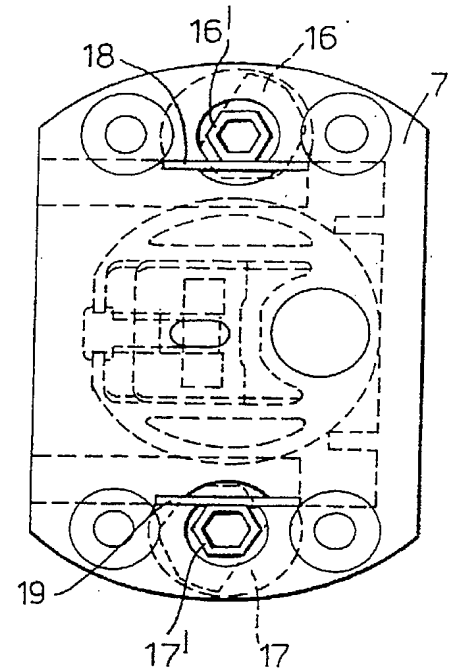


Fig.7.

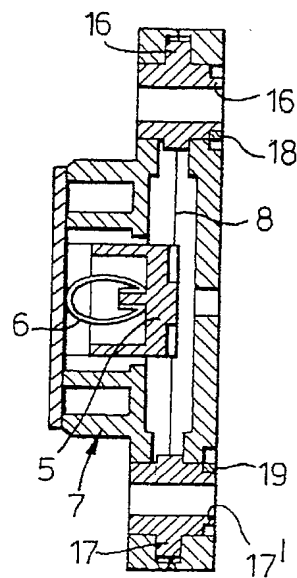


Fig.8.

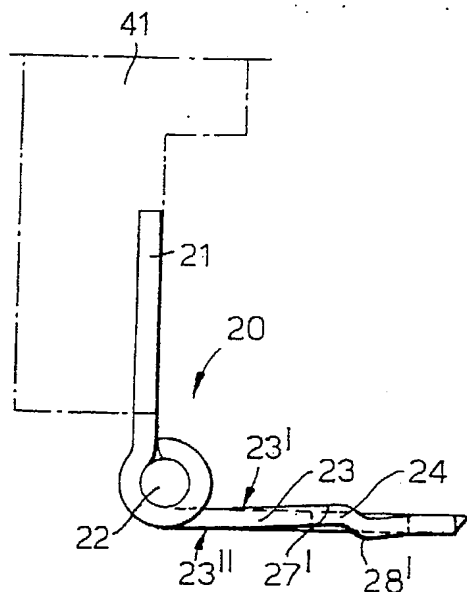


Fig.9.

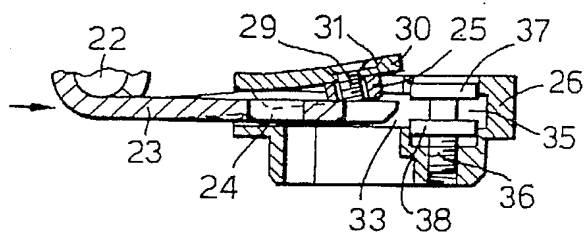


Fig.10.

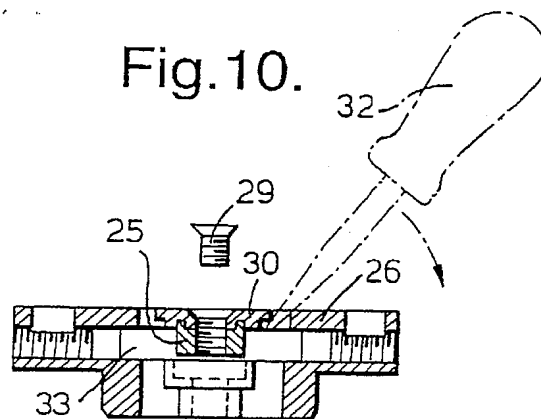


Fig.11.

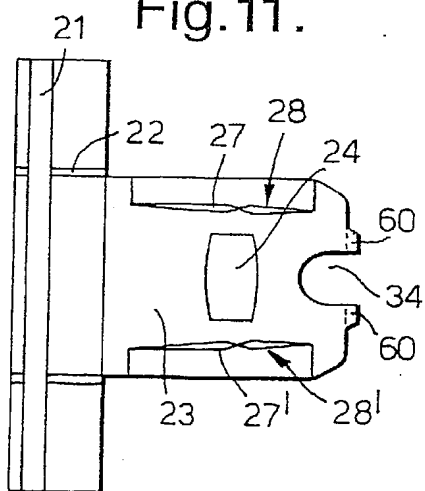


Fig.12.

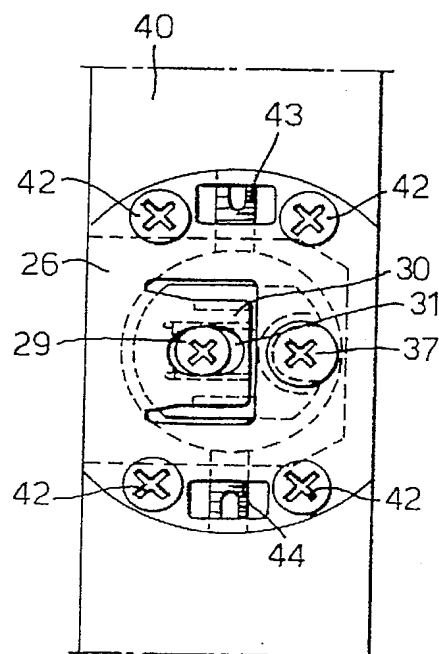


Fig.13.

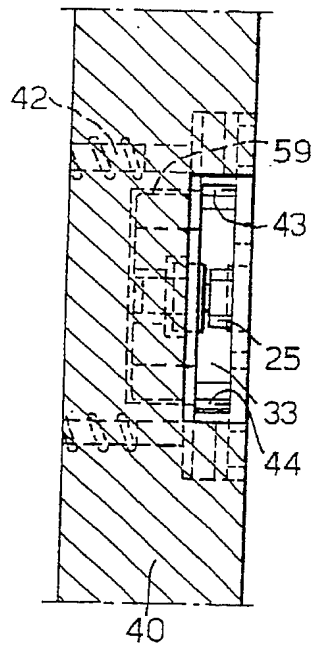


Fig.14.

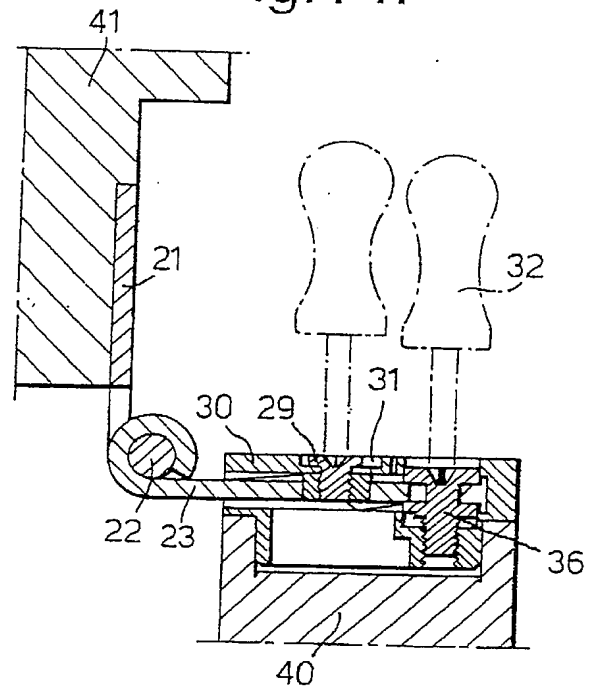


Fig.15.

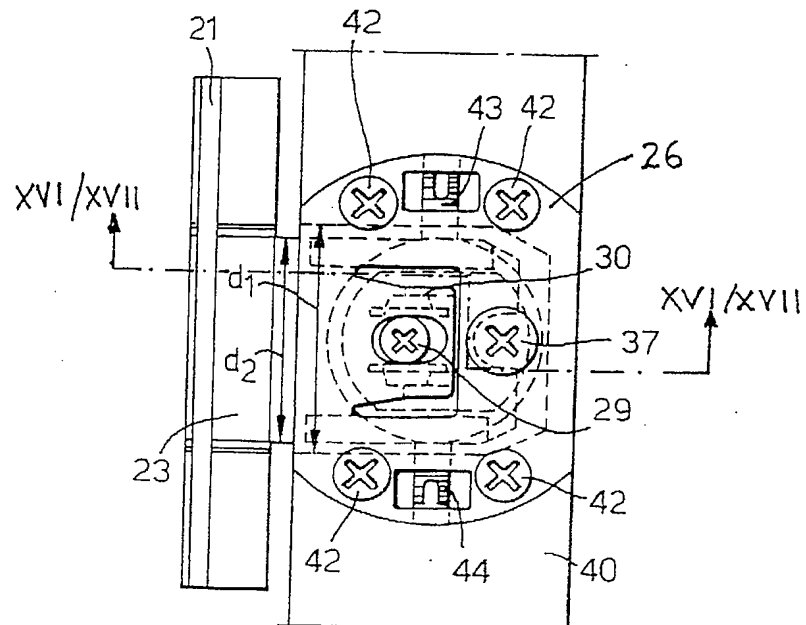


Fig.16.

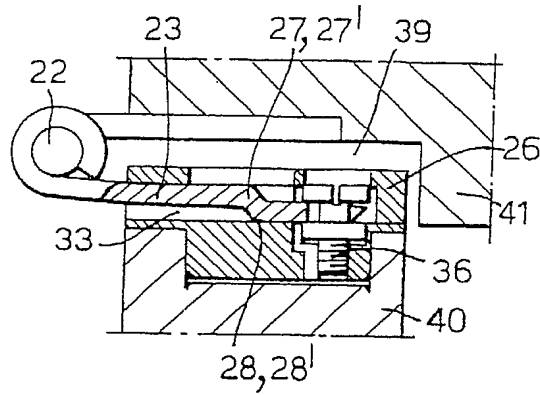


Fig.17.

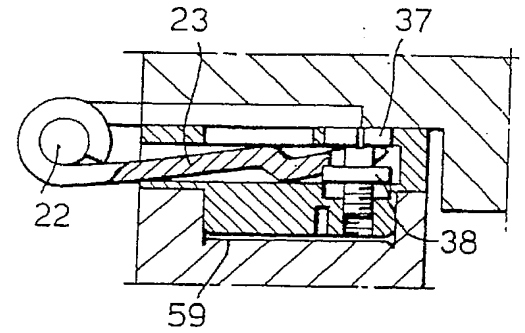


Fig.18.

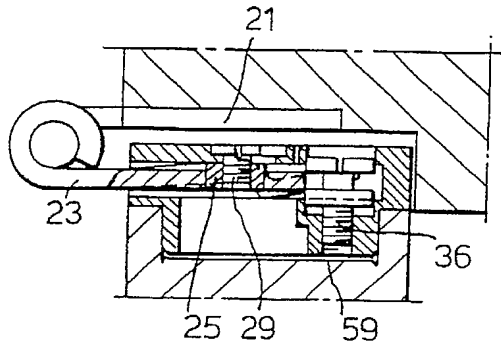


Fig.19.

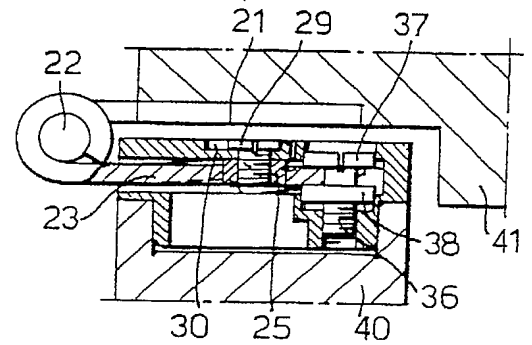


Fig.20.

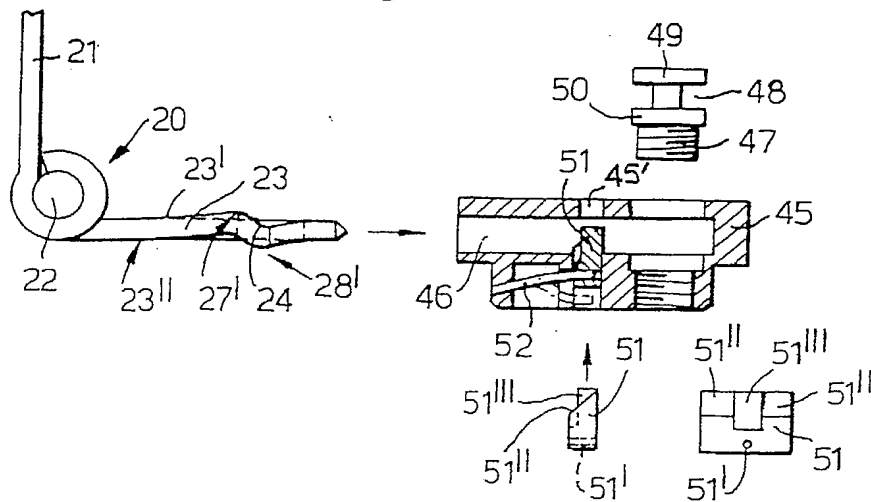


Fig.21.

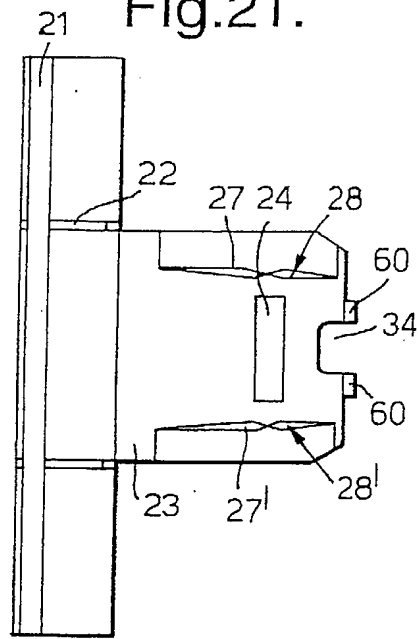


Fig.22.

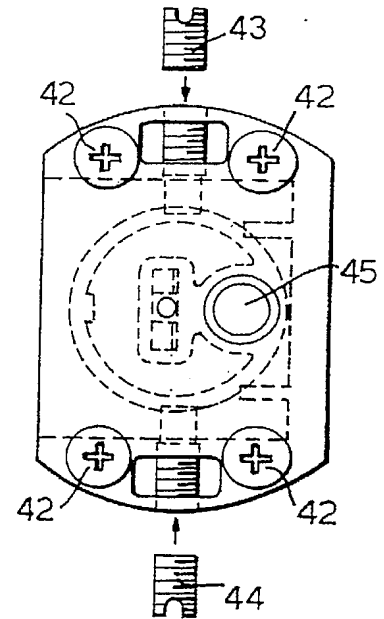


Fig.23.

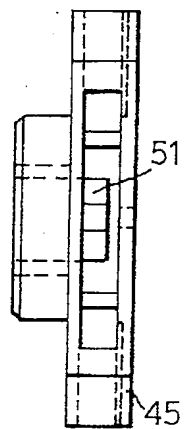


Fig.24.

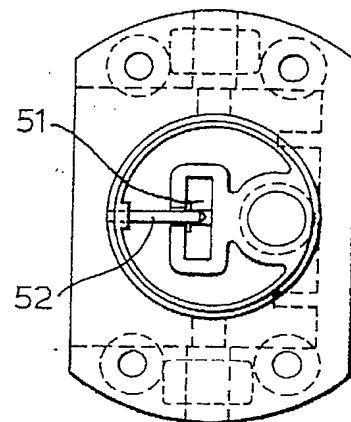


Fig.25.

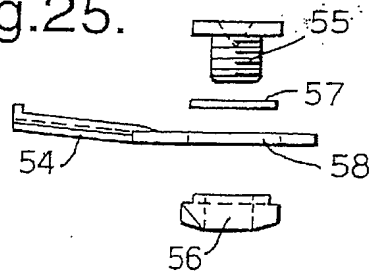


Fig.26.

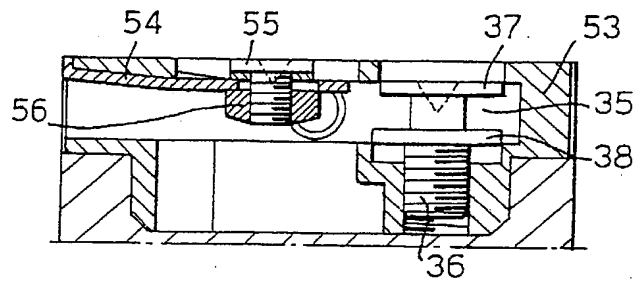


Fig.28.

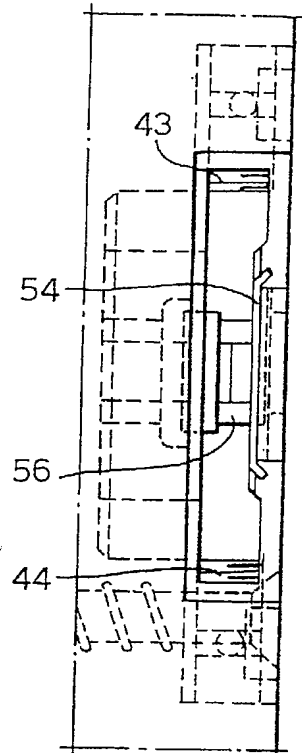
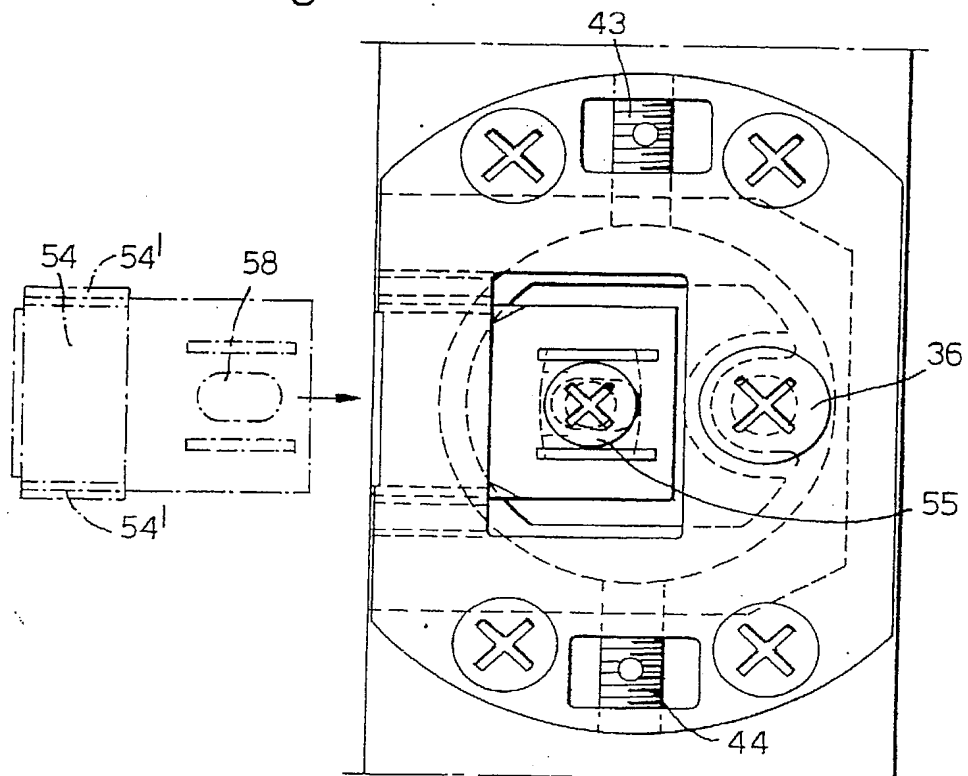


Fig.27.



HINGE DEVICE OF THE SNAP-IN TYPE

The present invention relates to a hinge device of the snap-in type for a door assembly comprising a door frame and a door leaf, wherein the hinge device consists of a receiving part for fastening to the door leaf and first and second hinge leaves pivotal relative to one another via an articulated joint, the first hinge leaf being capable of being secured to the door frame, and the second hinge leaf being designed for snap-in engagement with said receiving part, the receiving part having a pin or boss that is yielding on spring action and designed to snap into a hole or recess in the second hinge leaf, wherein said first and second hinge leaves rest with their surfaces substantially parallel when the door assembly is in a closed position.

Hinges of the snap-in type for a door assembly have been on the market for many years and have largely replaced the traditional lift-off hinges in the case of lighter internal doors.

Vertical adjustment has hitherto been achieved by moving the hinge in the recess. In hinges of the lift-off type it has been possible, however, to adjust the height upwards with the aid of washers.

The object of the present invention is to maintain the advantages that are present in a hinge of the snap-in type and allow the door leaf to be adjusted vertically by using an ordinary screwdriver.

Norwegian Patent 161394 relates to a hinge comprising two hinge leaves, wherein one of the hinge leaves is made having a tongue-like portion intended for insertion into a groove in a mounting, which preferably is designed for recessing in the edge of a door leaf. To enable the hinge to be used both for right-hand hinging and left-hand hinging of a door without it having to be turned on its head, both

the tongue-like portion and the groove are curved, the groove extending between two openings in the flat mounting which when installed faces outwards. The mounting consists of two parts that are displaceable relative to one another, and this permits adjustment of the hinge in the vertical direction in order to take up wear or compensate for production inaccuracies or skewness of the door frame.

US Patent 2885722 relates to hinges for hanging doors wherein both depthwise adjustment and vertical adjustment are possible to a certain extent. However, the hinge is not of the snap-in type.

US Patent 5339493 discloses a hinge which can be adjusted both laterally and vertically. Again, however, this is not a snap-in type hinge structure.

An object of the present invention is to turn to good account the advantages associated with a hinge structure of the snap-in type, and wherein a main object is to provide vertical adjustment to be easily made.

According to the invention there is provided a hinge device as claimed in the ensuing claim 1.

Vertical adjustment of the hinge device can be effected by letting the pocket of the receiving part have a width that is greater than the width of the lateral surfaces of the second hinge leaf, and a height that is greater than the thickness of the second hinge leaf, the receiving part along opposing lateral edges of the pocket having means for adjustable abutment against the opposing lateral edges of the second hinge leaf, whereby vertical adjustment of the hinge device is enabled, said adjustable abutting means consisting of a pair of rotatable, eccentric discs having a plurality of contact edge faces. Suitably said discs are spring loaded.

Embodiments of the invention will now be described in more detail with reference to the attached drawings, in which

5 Figs. 1-4 show an aspect of a hinge device according to the invention where depth and lateral adjustments are made possible;

Figs. 5-7 show a first and preferred embodiment of a hinge device according to the invention having a height adjustment feature; and

10 Figs. 8-28 show other aspects of a hinge device according to the invention.

Fig. 1 shows two hinge leaves 1, 2 that are pivotal relative to one another and which are pivotal via a pin joint 3. The hinge leaf 2 has a snap-in hole 4 which is
15 designed to engage with a pin 5 which under the action of a spring 6 is yielding when the hinge leaf 2 is pushed into the pocket 8 of the receiving part 7. The pin 5 is mounted in a slide 9 capable of being moved to and fro with the aid of an adjusting screw 10 which can be actuated by an
20 adjusting tool 11. The to and fro mobility of the pin 5 can be seen clearly from that illustrated in Figs. 2-4.

In the hinge leaf receiving pocket 8 on the receiving part there is provided on the opposing, largest wall surfaces of the pocket, and at approximately the same depth
25 in the pocket a pair of elevated portions 12, 13 which extend into the pocket compartment 8 and are intended for pivot point abutment against a respective lateral surface 2', 2" of the hinge leaf 2. The hinge leaf 2 at the free end portion thereof is made having a notch 14. The
30 receiving part 8 close to the bottom of the pocket 8 has an adjusting screw 15 with step flanges 15', 15", wherein the adjusting screw 15 upon insertion of the hinge leaf 2 into the pocket 8 enters the notch 14, and wherein the step flanges 15', 15", having a diameter greater than the width

of the notch 14, are designed to be capable of forming abutment against opposing surface portions 2', 2" of the hinge leaf 2, wherein turning the adjusting screw 15 will cause the free end portion of the hinge leaf 2 at the notch
5 14 to move upwards or downwards and tilt about the pivot points provided by the respective elevated portions 12, 13.

It will be appreciated that in this way the illustrated hinge device permits both lateral adjustment and depthwise adjustment.

10 As indicated in Fig. 6, by allowing the pocket 8 of the receiving part to have a width that is greater than the width of the lateral surfaces of the hinge leaf 2 and a height that is greater than the thickness of the hinge leaf 2, it will be possible to make a vertical adjustment of the
15 hinge leaf 2 relative to the receiving part 7. The receiving part 7 has adjustable abutting means 16, 17 consisting of rotatable, spring-loaded, eccentric discs 16, 17 having a plurality of contact edge faces. To maintain the eccentric discs in abutment against a respective lateral
20 edge of the hinge leaf 2, the respective disc is made in one piece with a hexagonal sleeve 16', 17' intended for engagement with a mating hexagonal key. Springs 18, 19 will cause a surface of the hexagonal sleeve to be spring-loaded by respective springs 18, 19, so that the eccentric discs
25 must be turned stepwise against the action from the respective spring 18, 19.

To cast and assemble the receiving part 7, it must normally be divided into two joinable parts 7', 7" and provided with a bottom cover 7'".

30 In the solution in Figs. 8-13, the hinge is indicated by means of the reference numeral 20 and consists of a first hinge part 21 which is connected to a second hinge leaf 23 via a swivel 22. The hinge leaf 23 has an engagement hole 24 to allow engagement with an engaging boss 25 on the
35 receiving part 26.

For the tilting function two pivot points 27, 28 are provided on the hinge leaf 23, on one side and the other side of the hinge leaf 23, respectively. As can be seen from Fig. 11, and with reference to Fig. 8, on opposing sides 23' and 23" there are provided pivot points 27, 28 in the form of elevated protuberances on each lateral surface, so that on the respective lateral surface 23', 23" of the hinge leaf there is a pair of such elevated protuberances 27, 27'; 28, 28'. The engaging boss is releasably secured to an elastic tongue 30 which is an integrally cast part of the receiving part 26. The boss 25 is moveable relative to the elastic tongue 30, the head of the fixing screw 29 being adjustable along a groove 31 in the elastic tongue. By adjusting the position of the screw 29 relative to the groove 31, as is evident from Figs. 18 and 19, it will be possible to make a depthwise adjustment of the hinge. If engagement between the boss 25 and the hole 24 in the hinge part 23 is required to be neutralised, the tongue 30 can be bent upwards using a tool, e.g., a screw driver, as shown in Fig. 2, and as also indicated in Fig. 9, whereby the hinge part 23 can be withdrawn from the insertion pocket 33 on the receiving part 26.

The tilting function of the hinge leaf 23 will be explained in more detail in connection with that illustrated in Figs. 9, 11, 14 and 16, 17.

The protuberances 27, 27' and 28, 28' on the respective lateral surfaces of the hinge leaf are intended to form abutment against the opposing, largest wall surfaces of the pocket 33. The protuberances are made in the hinge leaf 23, preferably by a pressing or punching operation, so that the protuberances along the respective lateral edges are offset relative to one another in the longitudinal direction of the hinge leaf and form an approximate wave shape, as is clear from Figs. 8, 16 and 17. By making the protuberances 27, 27', 28, 28' in this way, a considerable stiffening of the hinge leaf 23 is obtained simultaneously.

Figs. 16 and 17 are sections XVI/XVII - XVI/XVII on Fig. 15 showing the hinge device in two extreme tilting positions.

The hinge leaf 23 has in the free end portion thereof a notch 34 designed to enter the annular recess 35 on an
5 adjusting screw 36 between its step flanges 37, 38. By manipulating with a tool 32, which could well be the same tool as that used for adjusting the screw 29 relative to the groove 31, the adjusting screw 36, together with its step flanges 37, 38, is moved upwards or downwards, depending on
10 the direction of rotation of the tool 32. Thus, the hinge leaf 23 will tilt about the pivot points 27, 27', 28, 28', these pivot points or elevated protuberances forming an abutment against the opposing, largest wall surfaces of the pocket 33. In this embodiment of the device, the receiving
15 part is not equipped with pivot point means. As can be seen in Figs. 16 and 17, the adjustment of the screw in one direction or the other will effect a sideways adjustment of the hinge, thereby enabling the gap 39 between the door leaf 40 and the door frame 41 to be altered.

20 As shown in Fig. 15, the receiving part 26 is secured in a known way per se to the door leaf 40 by fixing screws 42.

In connection with Figs. 6 and 7, there was a description of adjustable abutting means positioned along
25 opposing lateral edges of the pocket for adjustable abutment against the opposing lateral edges of the hinge leaf, whereby the possibility of vertical adjustment of the hinge is achieved.

In the embodiment shown in Fig. 15, as an alternative
30 to the embodiment in Figs. 6 and 7, it is intended to provide the adjustable abutting means in the form of a pair of adjusting screws 43, 44. The width d_1 of the pocket 33 is greater than the distance d_2 between the lateral edges of the hinge leaf 23. This means that the hinge leaf has a certain
35 movement potential in the vertical direction of the door

assembly. To effect a vertical adjustment a coordinated adjustment of the adjusting screws 43 and 44 is made.

Another embodiment as shown in Figs. 20-24 will now be explained in more detail. The hinge 20 with its two
5 hinge leaves 21 and 23 has a design and mode of operation which essentially is as illustrated and described in connection with Figs. 8 and 11 and will not be repeated here unless different from what has been illustrated and described in connection with the previous embodiments. In
10 Fig. 20 the receiving part is indicated by means of reference numeral 45. The receiving part 45 has a pocket 46 for receiving the hinge leaf 23. The receiving part 45 close to the bottom of the pocket 46 has an adjusting screw 47 having annular groove 48 between step flanges 49, 50, as
15 has also been described in connection with the previous embodiments. By moving the adjusting screw 47 one way or the other, the hinge leaf 23 will tilt about the pivot points 27, 27', 28, 28' which form abutment against the opposing largest wall surfaces of the pocket.

20 The solution for the receiving part 45 shown in Fig. 20 does not allow any depthwise adjustment of the hinge. In the receiving part 45 there is secured a pin 51 that is yielding on spring action and which is spring-actuated by a spring 52 installed in an opening in the body of the
25 receiving part 45. The spring 52 may be, e.g., of leaf steel or made in the form of a spring wire. The spring 52 may be installed in the pin 51 in a hole 51' therein.

The vertical adjustment is effected in the same way as illustrated and described in connection with Fig. 12 and
30 will not be explained in more detail here, the same adjusting screws 43, 44 being used.

In order to provide a downward movement of the pin 51 when the hinge leaf 23 is introduced, the pin 51 is provided with two inclined faces 51" which are actuated by bevelled
35 pins 60 on the hinge leaf 23. Furthermore, the pin has a

middle portion which is not bevelled and which with the top thereof forms a contact face for a tool (not illustrated) which can be pushed down through a hole 45' in the receiving part to release the engagement between the pin 51 and the
5 hole 24.

The same solution applies to the embodiment in Figs. 1-7.

In the case of the embodiments in Figs. 8-19 and 25-28 the boss is shown to be bevelled to facilitate
10 insertion of the hinge leaf. However, in these embodiments the spring is tilted upwards by a tool 32 in order to release the engagement between the boss and the hole in the hinge leaf.

Another embodiment of the device according to the
15 invention, equipped with cast-in or attached elastic tongue, will now be described in connection with Figs. 25-28. The embodiment has in terms of function the same mode of operation per se as that shown and described in connection with the receiving part shown in Figs. 9, 10, 12, 13, 14-19.

20 Therefore, below there will simply follow a description of the structural differences without any detailed disclosure of the function.

In the embodiment as shown, inter alia, in Fig. 9, there is a spring 30 which is integrally cast with the
25 material of the receiving part 26. This would be an appropriate solution when, e.g., plastics material is used for the receiving part 26. However, if it is intended to use metal, e.g., zinc, for the receiving part 53, it would not be appropriate to allow the spring to be of such a
30 material. According to the invention, it is therefore proposed that there is provided as a spring material a spring 54 of spring steel which may have bent portions to provide sufficient stiffness and fastening flanges 54'. The spring 54 has an elongate hole 58 intended for receiving a

fixing screw 55 which forms a threaded connection with a boss 56. A locking washer 57 is preferably also provided. Since the hole 58 is elongate, it will be appreciated that on appropriate adjustment and tightening, the position of the boss 56 relative to the longitudinal direction of the hinge leaf can be varied, thereby obtaining the possibility of depthwise adjustment of the hinge. The vertical adjustment of the hinge is effected as shown and described in connection with Figs. 12, 15 and 22 and will not be elaborated upon here.

In Figs. 12 and 15 and also Fig. 27 it is shown how the receiving part is fastened to a door leaf 40. As illustrated, the receiving part runs right out to the lateral edges of the door leaf 40. As can be seen in the figures (e.g., Figs. 2, 7 and 9, 10), the receiving part is shown having two substantially cylindrical steps, so that the receiving part may optionally be turned 180° in a corresponding notch 59 which is made in the door leaf 40.

In order to allow vertical adjustment of the hinge, as shown for the embodiments of the hinge leaf illustrated inter alia in Figs. 5 and 22, it is essential that the engagement hole 24 is elongate in the transverse direction of the hinge leaf. Thus, the pin or the boss which is elastically yielding can change position in the hole 24 as the hinge leaf is adjusted up or down in the receiving part.

It will also be understood that between the adjusting screw, e.g., the screw 15 in Fig. 1, 36 in Fig. 9 or 47 in Fig. 20, it is necessary to provide a certain clearance relative to the insertion part or the hinge leaf when this tilts as a consequence of the movement of the adjusting screw in one direction or the other. However, it is conceivable that the sides of the step flanges on the adjusting screw which face towards the surfaces of the hinge leaf are slightly bevelled, so that there is a minimum clearance.

When the hinge structure is to be used, for instance, in fire doors, it will not be appropriate to make the receiving part in plastic, but rather of metal instead, e.g., brass or zinc. In such a case it may, for example, be
5 advantageous to use the solution outlined in connection with Figs. 20-24 or Figs. 25-28.

CLAIMS

1. A hinge device of the snap-in type for a door assembly comprising a door frame and a door leaf, wherein the hinge device consists of a receiving part for fastening to the door leaf and first and second hinge leaves pivotal relative to one another via an articulated joint, the first hinge leaf being capable of being secured to the door frame, and the second hinge leaf being designed for snap-in engagement with said receiving part, the receiving part having a pin or boss that is yielding on spring action and designed to snap into a hole or recess in the second hinge leaf, wherein said first and second hinge leaves rest with their surfaces substantially parallel when the door assembly is in a closed position, wherein said pocket has a width that is greater than the width of the lateral surfaces of the second hinge leaf, and a height that is greater than the thickness of the second hinge leaf, and wherein the receiving part along the opposing lateral edges of the pocket has means for adjustable abutment against the opposing lateral edges of the second hinge leaf whereby vertical hinge adjustment is enabled, said adjustable abutting means consisting of a pair of rotatable, eccentric discs having a plurality of contact edge faces.

2. A hinge device according to claim 1, wherein the said eccentric discs are spring loaded.

3. A device according to claim 1 or 2, wherein the second hinge leaf has a pivot point means in the form of elevated protuberances on both lateral surfaces of the second hinge leaf at each lateral edge thereof, and wherein the protuberances respectively form abutment against opposing largest wall surfaces of the pocket, the protuberances also constituting stiffening of the second hinge leaf.

4. A device according to claim 3, wherein the protuberances along the respective lateral edges are offset relative to one another in the longitudinal direction of the second hinge leaf and form an approximate wave shape.

5 5. A device according to any one of the preceding claims, wherein the pin or boss that is yielding on spring action is adjustably mounted by means of a set screw in an elongate opening of an elastic tongue on the receiving part, whereby depthwise hinge adjustment is obtainable.

10 6. A device according to claim 5, wherein the elastic tongue is an integrally cast part of the receiving part.

7. A device according to claim 5 or 6, wherein the elastic tongue is secured to the receiving part.

15 8. A device according to any one of claims 1 to 4, wherein the pin or boss that is yielding on spring action is placed in slide that is adjustable in the longitudinal direction of the pocket and is located in the receiving part, whereby depthwise hinge adjustment is obtainable.



13



INVESTOR IN PEOPLE

Application No: GB 0224795.5
Claims searched: 1-8

Examiner: Marc Collins
Date of search: 14 November 2002

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.T): E2F (FAC, FAD, FPC)

Int Cl (Ed.7): E05D (7/00, 7/02, 7/04, 7/06, 7/12)

Other: Online: EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	WO 97/22773 A1 (BRUSTLE) 26.06.97 See whole document especially WPI Abstract Accession No. 1997-341753 [31].	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.